COLUMBINE VINEYARDS

M. CARATAN, INC.

GRAPE GROWER AND SHIPPER

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Aug 20 1999

Dear Todd,

Enclosed please find my prepared statement for the public hearing of Aug. 17. During my oral presentation I omitted some portions of this in the interest of saving time.

I did include in our package most of the papers which I had referenced except for the ones which I assumed that you had such as the Cornell Paper and the "Ohio Health Study" by Dain, et al. If you need anything, don't hesitate to let me know.

I am also enclosing a copy of Jerel Kratt's business card if you'd like to talk to him about composting. I also am giving you his E-mail.

It was good to see you again. Take care

Paul Caratan

Address Book Document

Kratt, Jerel

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Feeds And
Soil Amendments
Spreading

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DARO
COMMODITIES

JEREL KRATT
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THE COMPOSTING PROCESS

Sewage Sludge Class B: Is composted at 95° for 15 days.[1] Note that this is nearly the same temperature as the human body. This temperature with moisture will actually increase some pathogen numbers.

Yard Waste (Green Waste) Compost: Most of this product originates from Southern California and is processed in Kern County. It is cooked at 140 degrees F (between 125 and 150) for about 4 months. Each windrow is watered and turned once every 10 days. Temperatures are monitored and recorded. The higher temperatures sustained over a long time period insure a very substantial pathogen kill. (2)

Dairy and Steer Manure Compost: Is handled nearly the same way as yard waste compost at Community Recycling except that a longer cooking time than 4 months is required. (3)

[1] As reported in the April 11, 1999 edition of the Bakersfield Californian.

2 As reported by Jere[illegible] who works [illegible]

Presentation on the Proposed General Order To SWRCB
By Paul Giboney on Behalf of Kern Food Growers Against sewage Sludge
August 17, 1999

My name is Paul Giboney and I am with the KFGASS, I have an MS degree. In the past I have worked for a hydrologist-geologist. I am now the ranch agronomist for M. Caratan Inc.

Edwin has submitted a brief overview of our observations and concerns over what we read in the DEIR. There are many factual errors and inappropriate assumptions in the DEIR which have lead to the development of this proposed General order. This general order is insufficiently protective of our water resources, agricultural productivity, environment and human health.

I will limit my comments to a few major components of the G.O. which are indicative of problems we encountered.

Page 7

8.a. It is acknowledged that pathogens can be present. EPA permits up to 2,000,000 E Coli per gram of class B sludge. A single bacterial analysis is not necessarily indicative of the levels of the other pathogens. It takes only a single protozoan, virus or worm to infect.

"In Europe an epidemiological causal relationship was found between the agricultural utilisation of municipal sewage sludge and salmonella infections in cattle herds. In an analysis of nearly 27,000 cases within ten years." 28-1

"There was unequivocal accumulation of infections with salmonellas."

Strauch 1991

The 1993 Cryptosporidium outbreak in Milwaukee was the result of a water borne pathogen from a sewage treatment facility. This disease is so serious that Los Angeles Metropolitan Water District has spent $3.3 million on a Cryptosporidium Action Plan, as of 1997. To date, there is no commercially feasible domestic water treatment for Cryptosporidium.

MWD News Release, 1997

28-1 (cont)

Several references have been made to the study by Dorn, et.al., (1985) throughout this draft EIR. Much of what is presented in this draft concerning the Dorn papers a.k.a. the Ohio Health Study is not correct.

Only 27 % of the 93 farms completed the full three year study
The mathematical calculations in the EIR are incorrect. A metric ton equals 1.102 tons and a hectare equals 2.471 acres. At 25% solids (75% moisture) 2-10 dry metric tons would be equivalent to 3.6-17.8 wet tons per acre, not 20-90 as was stated. Furthermore, these application rates are significantly less than the calculated 30 wet tons per acre being applied in Kern County.

The number of acres treated and therefore the opportunity for exposure and contamination is much less in the Ohio Study compared to Kern County. The Ohio Study average treated acres ranged between 37 and 116. The smallest permitted site in Kern County is 560 acres.

28-2

There is no description of the Ohio Study sludge. It is unknown what the treatment was or what pathogens, heavy metals, organics or other contaminants were applied.

Key statements found in the four papers that make up the Ohio Health Study have been omitted from this Draft EIR.

i) "Significant cadmium and lead accumulations were found in the kidneys of calves grazing sludge treated pastures."(pg. 360)

ii) "the possibility of PCB and other toxic organics reaching crop land is an issue of concern to farmers....More research is needed."(pg. 4)

iii) "Caution should be exercised in using these data to predict health risks associated with sludges containing higher levels of disease agents and with higher sludge application rates and larger acreages treated per farm than used in this study....there remain questions about human and animal health consequences"
(pg. 332)

Dorn, et.al., 1985
Reddy, et.al.,1985
Brown, 1985

The Ohio Health Study has very little in common with what is being done in California and should not be considered to at all indicative of the safety of sludge use.

28-2 (cont)

"One should not underestimate the significance of yeasts and fungi for public health, especially in connection with the agricultural utilization of sewage sludge. At present, the significance of these microbes in public has not been properly estimated"

"This investigation shows that it is a perversion of hygienic principles for more and more sewage to be collected and treated with more sophisticated methods in plants if sludge – which consists mainly of human feces – is then distributed over large areas without being disinfected"

Strauch, 1991

Page 7

8.b. It is also acknowledged in the G.O. that heavy metals are present. But again, the potential problem is depreciated in part by some sweeping incorrect assumption about our valley's soils.

A significant portion of the valley soils are light and highly permeable. Nearly all have less than 2% organic matter and many of our soils are no longer alkaline.

28-3

This map drawn by hydrologist-geologist, Michael R. Rector for demonstration purposes illustrates my points. Data from DWR was used to indentify those areas in Kern County which have differing groundwater recharge rates. Or another way to look at it is how quickly the groundwater below a pollution source can become contaminated. "A" represents those areas that are immediately

rechargeable/contaminated. "B" represents those areas with a reduced rate of recharge. "C" on the west side signifies those areas that are very slow or are undesirable for recharge programs.

28-3 (cont)

It is true that colloids, carbonates and complexes often times do retain metals. But not always and not always irreversibly.

1) Surfactants, a major organic component appear to concentrate in sludge and have been shown to desorb some pollutants from soils.
Dentel, et.al., 1993

2) Humic acids from sludge will not remain in the soil indefinitely. As they oxidize and degrade, the heavy metals they retain will be released back into the soil solution becoming plant available and vulnerable to leaching. McBride, 1995
McBride, 1998

28-4

3) Many of our valley soils have less than 10% clay and therefore will not contribute significantly to heavy metal or other contaminant retention.

4) Heavy metals from sludge do not always behave in the same predictable manner as metals from an inorganic source such as native materials or fertilizer. Sludge metals are often non-reactive and can be found in a soluble or colloidal state very susceptible to leaching. McBride, 1995

In fact, there is much evidence that biosolids derived metals do move within the soil profile and present a threat to groundwater, regardless of the depth to groundwater.

Transport of some metals has been observed in percolating water at a field site where sludge was applied ten years earlier.
Harrison, et.al., 1997

28-5

Up to 60% of some sludge applied heavy metals have been "lost" in a mass balance study in a silt loam soil. Those metals did not remain where they were applied. Baveye, et.al., 1999

If even a very small fraction of a highly toxic element such as Hg is converted into a more mobile or volatile form as may be the case for conversion of the immobile Hg t2 ion to methymercury or Hg, the risk to groundwater and the environment could be significant. McBride, 1995

EPA conducted tests on only a few relatively metal-insensitive crops such as corn.
McBride, 1995
McBride, 1997

"A given metal....can be hazardous to those who consume the produce, whether or not there was harm to the plants."....

"The result for multiple toxicities need additional consideration"

"It can be expected that multiple-element toxicities will occur in high pH soil as well as on low pH soils"

"Studies need to involve at least up to 40 or more years"

"Some growers have used the products for as much as 40 years continuously and toxicties are showing on plants and proved by analyses...Five metals, cadmium, copper, lead, nickel and zinc are often elevated in soil extracts and leaf analyses" Wallace, 1994

28-5 (cont)

How will post treatment-cropping options be limited to those crops which are not sensitive to metals and do not accumulate potentially toxic levels of heavy metals?

Case in point:
In 1998 the U.S.F.D.A. discovered high levels of lead in two separate incidents in a food crop. One crop was destined for baby food. Source of the lead was from past use of lead arsenate in the previous apple orchards ending about 1950.

28-6

"Exposure to lead can retard neurological development in young children and result in permanent loss of intelligence. FDA believes lead, at any level of exposure, acts negatively on the human nervous system and the agency has not set a permissible level of exposure in flood"

"FDA does not have a good understanding of how elevated levels of lead in soil contribute to high levels in produce commodities"

Private communications, 1998

28-6 (cont)

Even now after 40 or more years of reclamations, 25% of Kern County hay is high in Molybdenum, which by the way does not follow the generalization of being less toxic in alkaline soils. How does it make any sense at all to add more molybdenum or selenium for that matter where we already have a well documented history of toxic excesses?

28-7

Page 8 10.

"Until there is sufficient justification (i.e., a potentially significant health risk associated with biosolids is identified), it is unlikely that regulations will be developed to establish limitations on the SOCs in biosolids." (Quote from DEIR)

This philosophy is in complete contrast with EPA pesticide policy where pesticides must go through exhaustive testing and proven safe before used. EPA in the case of sludge, which has literally thousands of active ingredients of inconsistent quality, has allowed its nearly indiscriminate use and demands that society and the environment must prove harm before sludge is properly regulated. This approach is neither scientific, prudent or protective.

28-8

There is much evidence that SOC's (Synthetic Organic Chemicals) present a risk. Levels of major mutagenic and carcinogenic Polycyclic Aromatic Hydrocarbons are found in industrialized sludge. Bodzek, 1999

French researchers have determined that agricultural volatilization of sludge's organic pollutant is a major risk and have imposed limits on chlorobiphenyls. Dupont, 1999

Nonylphenols in sludge are persistent and toxic and effect plants, aquatic organisms, including significant negative effects on segmented seaworms. Nonylphenols present serious health risks to humans.

Hansen,et.al.,1999
Lin,et al.,1999

Surfactants, both anionic and cationic are not destroyed during sludge treatment but are concentrated. This has considerable implications due to the result that the surfactants can mobilize organic pollutants in land application sites and facilitate groundwater contamination.

Dentel,1993

a) root crops will retain several organic compounds.
b) some chlorophenols are predicated to have a high potential for crop uptake and translocation.
c) Some organic chemicals also have a high potential to leach to groundwater including chloranilines, mononitrophenols, dinitrotoluene, and bis(2-chloroethoxy) methane, if they are not first taken up by the crop.
d) Foliar uptake plays a major role in plant uptake and is particularly important for forage systems where subsequent bioaccumulation into grazing animals becomes a significant consideration.

Duarte-Davidson, et.at., 1996

28-9

A paper was published in 1999 by British researchers that found scientific data so limited that physical and chemical was used in very basic models to attempt to predict environmental fate and risk. "It is important to consider the potentially large errors associated with such estimates. However, at this stage they represent a best estimate in the absence of measured data."

a) Chlorinated Paraffins
   i) Sufficiently persistent to be capable of long-range atmospheric transport.
   ii) Meets criteria as a Persistent Oraganic Pollulant.
b) PCN'S
   i) Several have dioxin activity
   ii) Strongly bioaccumulating, found in Swedish fish.
c) DEHP
   i) European Union Scientific Committee for Food has set up limits For Tolerable Daily Intake
   ii) Detected in nearly all Swedish Sludge.
   iii) Possibly oestrogenic
d) Pharmaceuticals
   i) Metabolites originating from medical substances have been measured in groundwater and it is not possible to predict their environmental fate.

28-10

ii) Information about environmental behavior and ecotoxicology of these biologically active substances is generally unavailable.

iii) The extent of transformations and significance of partial degradation to produce different metabolites has not been investigated to date. Alock,et.al.,1999

28-10 (cont)

Page 12 19.

We beg to differ with this statement. As previously discussed, sewage sludge is a hazardous material. Sludge, especially from industrial areas is an inconsistent product that has thousands of active ingredients, some of which behave synergistically when combined. An objective, purely scientific review of the data would strongly indicate to this board that the near indiscriminate application of pathogens, heavy metals, known and unknown chemicals virtually guarantees a severe environmental consequence.

28-11

Page 13 A. 3&4

It has already been previously acknowledged in this document that sludge (see 8a & 8b) has "characteristics which can create water quality and public health problems." This G.O. assumes that the soil has some sort of magical quality which detoxifies whatever pollutants are disposed of there.

Furthermore, it is clear in this document that the sludge user has not been given enough information to insure that pollution does not occur. Yet the user is threatened with responsibility for any failure through the California Water Code and Safe Drinking Water and Toxic Enforcement Act. The state and sludge generators have been delinked from primary responsibility and the sludge user remains the ultimate responsible party.

28-12

Page 14 A.7.

Thirty days runoff protection is in adequate. Cryptosporidium and ascaris can remain viable and infective for over a year. Heavy metals, unless they leach out first, can remain in the soil and contaminate surface water during runoff.

28-13

Page 14 A.12 & B4

Why is the concentration of Cu and Pb lower in the G.O. than EPA's 503, and yet the cumulative loading rate remains the same?

28-14

Why is there no cumulative loading rate for chromium?

28-15

Page 16 B.7.b.

Either sludge is safe and public exposure is ok or it is not safe and no public exposure shall be permitted. Again, pesticide laws do not arbitrarily discriminate between the number of people who may enter a field following treatment. This indicates that in the minds of the authors of the G.O., that there is some risk. Please explain why for the sake of a disposal operation we are putting field workers at risk.

28-16

Page 17 B.7.b. 3-5

As previously discussed in these comments, the remain serious concerns over the ultimate fate of many contaminants found in sludge. This puts both the producer and consumer at risk.

28-17

Page 18 C. 1&3

Storing sludge for any length of time at all allows for the exponential regrowth of many pathogens. This could likely render any testing at the generator facility meaningless.

28-18

Page 22 17.

"The discharger shall report any noncompliance which may endanger human health or the environment." This is a completely subjective decision in which users are asked to police themselves. Given that sludge users are paid to dispose of the material and the nearly non-existent level of enforcement, there is little that would compel an individual to report on his own activities.

28-19

Page 23 18.

Sludge analyses and disposal site records should be maintained in perpetuity. This is the same procedure for the disposal of other toxics. These records will provide valuable information when environmental incidents are investigated.

28-20

Responses to Comments from the Columbine Vineyards

28-1. EPA determined that the required minimum standards for treatment and the numerical criteria for Class A and B biosolids were adequate on a national level to minimize risks to public health. The SWRCB is using these as a starting point for the provisions of the proposed GO. Additional management measures are contained in the general permit. Mitigation Measure 5-2 and other restrictions on site access should provide for added protection against residual pathogens in Class B biosolids.

Regarding *salmonella* contamination in cattle herds, see Responses to Comments 26-36, 26-40, and 26-42.

Regarding Strauch 1991, see Responses to Comments 26-39 and 26-42.

Regarding the *Cryptosporidium* outbreaks in Milwaukee, see Responses to Comments 26-36 and 26-38.

28-2. See Master Response 18 and Response to Comment 26-41.

28-3. This comment is similar to Comment 26-20 and criticizes the draft EIR for making sweeping general or incorrect statements about San Joaquin Valley soils and their ability to retain metals applied to agricultural lands with biosolids.

See Response to Comment 26-20; a draft EIR covering the entire state must make certain generalizations to put the potential problem in proper perspective. The same paragraph containing the general statement went on to describe the sandy, highly permeable soil conditions that occur on the east side of the San Joaquin Valley.

28-4. This comment effectively says that in some situations, metals applied in biosolids are more mobile and bio-available than, for example, metals contained in fertilizers and noted San Joaquin Valley soils. In these cases, clay contents are often less than 10% and may have little natural capability to bind or attenuate the applied metals when in a colloidal state.

Comment noted. However, this comment does not change the EIR conclusions or cause the SWRCB staff to significantly modify the mitigation measure (Mitigation Measure 4-1), which protects soil productivity by eliminating sites with limitations such as acidic soils, or soils with low cation exchange capacities. It is likely that most soils with low organic matter content and having less than 10% clay will have cation exchange capacities less than 15 milliequivalents per 100 grams, making them ineligible for consideration under the proposed GO.

Also see Responses to Comments 21-57 and 26-20.

28-5. The comment author makes several separate points here, including observations that a metal, if not toxic to the plant, can still be toxic to those who consume the produce; that multiple element toxicities can occur with additive and synergistic effects; and that metal toxicities can occur in non-acidic (alkaline) soils. The author concluded that studies of up to 40 years duration are needed to resolve the issues regarding the agricultural use of biosolids and possible long-term effects. The commenter also pointed out that problems with metal toxicities have been noted in California soils to which biosolids have been applied, and questioned how post-treatment crop limitations will be imposed on sensitive and bioaccumulative crops.

SWRCB staff agrees with the commenter: that plants can bio-accumulate metals and not display any outward symptoms of plant toxicity; that multiple element toxicity can occur (see page 4-7 of the draft EIR, last sentence, third paragraph); and that some metals can be bio-available at neutral to alkaline pH's (see page 4-11 of the draft EIR, last sentence, fourth paragraph and Table D-7 in Appendix D of the draft EIR).

For response to the comment on incidences of metal-related plant toxicities in California, see the Response to Comment 26-20. Regarding long-term study needs, there are many ongoing research programs evaluating biosolids application on agricultural soils. As results are reached that change the view of long term impacts, the Part 503 regulations may be updated. These may be included in updates of the proposed GO if determined appropriate (see GO Provision 13).

For the response to the question regarding post-treatment cropping limitations, see the Response to Comment 26-28 and the revised Mitigation Measure 4-2.

Additionally, SWRCB staff respectfully disagrees with the comment that implies that results of case studies showing site-specific contaminant behavior that is different than those assumptions used by EPA in risk assessments for the Part 503 regulations would invalidate impact assessments in the EIR. Master Responses 13 and 14 generally describe the basis for the analysis of potential surface and groundwater quality impacts in the EIR with respect to risk assessments conducted for the Part 503 regulations, additional protective measures in the proposed GO, and the authority of RWQCB staff to use monitoring and professional judgment to determine whether a specific biosolids application project would be protective of water quality. The SWRCB staff acknowledges that areas of controversy exist over specific waste management issues not evaluated for the Part 503 regulation development process. The SWRCB staff also acknowledges that case studies have indicated that certain environmental conditions can produce results that are contradictory to Part 503 risk assessment assumptions. However, each risk assessment conducted for the Part 503 regulations included numerous conservative factors so that the established standards would not be invalidated by the uncertainty in those factors. Consequently, it is the SWRCB staff's position that results of individual case studies do not necessarily invalidate the Part 503 regulations or the analysis of potential impacts in

the EIR that rely on those risk assessments. Also see Responses to Comments 26-19 and 26-22.

28-6. The EPA risk assessments conducted to support development of the Part 503 regulations evaluated lead in biosolids and examined the risks associated with exposure for several pathways (See Appendix B of the final EIR). The numerical limits developed by EPA and proposed for use by the SWRCB are deemed protective of public health. The proposed GO requires analyses of biosolids prior to application and monitoring to detect any impact on water supplies. Any biosolids containing high lead levels would be precluded from being land-applied under the provisions of the proposed GO. Also see Response to Comment 26-28.

28-7. The commenter notes that approximately 25% of the hay grown in Kern County contains elevated levels of molybdenum (Mo) and questions why it would be appropriate to add sludge containing Mo (and selenium [Se]) to lands that already have native soil levels of elements that can cause nutritional problems to animals grazing on hay or feed grown on such lands. The commenter also states that Mo is not less toxic (less bioavailable) in alkaline soils.

Please also see Responses to Comments 12-2 and 26-32. Appendix D, Table D-7 of the draft EIR shows that several elements, including Mo, are not less mobile but more bioavailable at alkaline soil pHs.

The Pre-Application Report (see Appendix A) requires that the applicator test soils at proposed biosolids land application sites for a suite of elements including copper (Cu), Mo, and Se. Mitigation Measure 4-1, as revised, requires that application recommendations be prepared by a certified agronomist or soil scientist. These professionals must also consider a full range of soil, biosolids and crop nutrients and elements in arriving at agronomically appropriate biosolids application rates. (Note that the Part 503 regulations require only the agronomic consideration of nitrogen, and then only to protect water quality.) The intent of this mitigation measure is that overall soil fertility and plant nutrition be considered, including the presence of toxic elements native to soils and present in biosolids. It may very well be that the professional developing the biosolids application recommendations does not recommend any biosolids be applied to lands where Se and Mo are elevated and where biosolids also contain elevated levels of these elements.

28-8. The commenter disagrees with the draft EIR statement that SOCs may not be regulated until additional research concludes a health risk exists and a regulatory need has been demonstrated. The commenter compares it to EPA's pesticide regulation philosophy, where the burden of proof for safety rests with the pesticide manufacturer. Additional information is also presented on the persistence and toxicity of SOCs in biosolids through cited references, including information on uptake by root crops, as well as foliar uptake.

The additional information on SOCs in biosolids and biosolid-amended soils provided by the comment author is acknowledged. It is agreed that there are several SOCs that are more persistent, that do not degrade easily in the sludge treatment process, and that could escape detection because of matrix interference effects, or because they are not readily and easily detected with industry-common commercial analytical test methods. More research in this area is needed.

As with metals, there remains some scientific uncertainty and public controversy over the persistence and fate of SOCs when applied to soils through biosolids additions. Please note that this opinion completely contradicts the opinions expressed by many biosolid generators in their comments on this draft EIR. The SWRCB staff does not believe there is a demonstrated risk from SOCs in biosolids that warrant additional safeguards beyond those provided by the recommended Mitigation Measure 4-2.

The information provided on SOCs by the commenter does not change the conclusions and recommendations regarding potential biosolid-derived SOC impacts on grazing land productivity, which is considered to be potentially significant. It reinforces the belief that a longer waiting period following biosolid application prior to introduction of grazing animals than is provided in the current Part 503 regulations is warranted.

The NRC, which reviewed the grazing wait period issue in its 1996 publication, did not comment on the need for additional research or safeguards with respect to protection of soil productivity or crop quality from SOCs in biosolids. The NRC did, however, recommend that the 30-day grazing waiting period be reviewed, principally for additional protection from pathogens, allowing additional time for soil bioremediation. This concept has been included in Mitigation Measure 4-2, which extends the waiting period for grazing animals to 60-90 days. Although this is principally for protection from disease pathogens, it also allows for additional time for natural soil biodegradation of SOCs following biosolids incorporation. Also see Response to Comment 28-5.

28-9. See Master Response 7, and Responses to Comments 26-23 and 28-8.

28-10. The paper cited (Alcock et al. 1999) was based on a literature review for compounds which they hypothesize could potentially exist in sludge and could potentially be transferred from soil/plants to grazing livestock from biosolids land application. Risk assessment is an evolving tool, but is being supplemented by an increasing database of environmental measurements. The proposed GO relies on the basic work done by the EPA in developing the Part 503 regulations. These regulations are supplemented with various management provisions and requirements that will be implemented through the proposed GO or with site-specific permits as the need arises, at the discretion of the RWQCB Executive Officer for each permit application.

PCNs (polychlorinated naphthalene compounds) include a large number of compounds (75) which are not typically measured in biosolids samples using the conventional priority

pollutant testing methods. These compounds were introduced at the turn of the century and used for cable insulation, wood preservatives, engine oil additives and as feedstock for dye production similar to the uses of PCBs (Alcock et al. 1999). Synthesis of these compounds ceased in the U.S. in 1977. Any remaining sources are likely to be in the form of waste incineration and landfill disposal of items containing PCN's. No actual test data for PCN's is available due to the lack of measurement techniques for such a complex matrix such as biosolids, and the fact that they probably will not be detected given the limited amount likely to be present in wastewater or biosolids. If detectable, concentrations are likely to be very low; in the parts per billion range.

Regarding risk assessments, estimated baseline cancer risks associated with the land application of sewage sludge, based on key pollutants of concern, were evaluated during development of the Part 503 regulations. The highest potential risk was derived from hexachlorobenzene at values equal to the limits of detection. It accounted for almost one-third of the total estimated cancer risk of 0.5 cases/year of aggregate risk. Diethylhexylphthalate was included in the risk assessment (ABT Associates 1992).

Exposure to hexachlorobenzene is believed to occur primarily through land application via a potential pathway in which sludge is ingested by grazing animals which are then consumed by humans. It must be noted that hexachlorobenzene was not detected in sludge from any of the samples in the analytic survey of the National Sewage Sludge Survey (ABT Associates 1992). The lifetime risk for a highly exposed individual was 6×10^{-4} and for a highly exposed individual 1×10^{-7} for cancer based on organic pollutants. For lead, the health risks are much higher, with an estimated risk of 0-500 cases of disease per year estimated to occur as a result of increasing background levels of lead in agricultural products (ABT Associates 1992). Sludge pollutants examined in the land application risk assessment are shown in Table 1-2 of the risk assessment; a breakdown of the estimated baseline nationwide risk from all sludge land application is shown in Table 4-8 of the risk assessment. A comparison of the risk reference dose for the average and highly exposed individual are shown in Tables 4-9 and 4-10 of the risk assessment.

The limiting of annual and cumulative loadings of pollutants from land-applied sludge, combined with management practices, is intended to reduce potential dietary risks; however, based on the very limited amount of existing information and the methods used in the risk assessment, it could not be quantified. But, the residual risk was likely to exceed baseline risk. It was estimated that the likely health benefit from regulating land application was the avoidance of up to 0.4 cancer cases per year and about 20 cases of non-cancer disease (mostly hypertension). Included in the pollutants assessed was diethylhexylphthalate, which for years has been a known environmental contaminant. It is present in biosolids, but at very low concentrations -- typically less than 50 mg/kg (parts per million) (Orange County Sanitation District 1999). The EPA risk assessments showed it to be a relatively low-risk compound.

Regarding residual metabolites from medical substances, the issue of pharmaceuticals in wastewater and biosolids is an emerging area of research. To date, data is lacking on the presence of such compounds in surface waters and groundwater. Much more must be learned about the environmental fate and behavior, and possible impacts of trace amounts of these compounds in the environment. If regulatory programs are eventually developed to limit residual quantities in wastewater, then the proposed GO can be modified to reflect any need to better manage biosolids to limit introduction into the environment. At present, there is no evidence to indicate that residual metabolites pose any threat to public health or beneficial uses.

28-11. The statements made are unsubstantiated. The National Sewage Sludge Survey has, for the most part, adequately characterized sewage sludge. Where the National Academy of Sciences noted that more sensitive data could be required, the proposed GO requires such monitoring. Currently, EPA and the U.S. Department of Agriculture have accepted biosolids use as beneficial. The U.S. Department of Agriculture even recommended use of biosolids in organic farming.

28-12. If biosolids were not potentially harmful to the environment if mismanaged, the SWRCB would not be proposing to regulate them under general waste discharge requirements. However, similar to pesticides or other regulated substances, biosolids used as a soil amendment are not believed harmful when properly used. Regulation of this material under the proposed GO is intended to adequately protect the environment.

28-13. The 30-day exposure period is required to allow for desiccation and ultraviolet radiation treatment of those surface pathogens that are potentially subject to offsite migration. Metals are not believed to leach significantly to warrant alarm.

28-14. See Master Response 4.

28-15. See Master Response 4.

28-16. The Part 503 regulations and the proposed GO take a conservative approach to biosolids management. Restricting access to fields to 30 days (for low potential for exposure) to 1 year (for a high potential for public exposure) are site restrictions imposed for Class B biosolids applied to land. The minimum 30-day period has been determined to be a time in which most residual pathogens will have been killed by environmental exposure (see Mitigation Measures 4-1 and 5-2 in Appendix C of this final EIR). Field workers should be informed of the presence of biosolids and told to practice good hygiene (such as washing hands before eating, working safely to avoid injuries that could become infected if exposed to biosolids, wearing boots and cleaning them after work or avoiding taking them home and tracking material in the house) when laboring in the areas where biosolids have been applied.

28-17. Both the EPA and SWRCB staff realize there continues to be public concern regarding the land application of biosolids. The federal regulation and the proposed GO are designed to take advantage of current scientific research on known and potential health risks, and are felt to adequately protect human and animal health.

Perhaps the most concise and frank summary of use of biosolids on agricultural land was found at the Texas A&M Agricultural News Web site (http://agnews.tamu.edu/in), a synopsis of information compiled by David Tenenbaum. This information provides a good overview of the pros and cons of the risks. It describes research related to sewage sludge land application, including information by Dr. Suresh Pillai on aerosols from spray irrigation of sludge (cited in the draft EIR and by some commenters).

28-18. Bacteria have the potential to regrow. However, waiting periods, restrictions for allowing runoff, and access restrictions are specified to provide conditions that protect the environment. The viability of such bacteria after application to soil is well-researched and not believed to threaten the environment provided the discharger complies with federal laws and the proposed GO. Also, see Response to Comment 10-4.

28-19. See Master Response 1 and Response to Comment 14-23.

28-20. See Response to Comment 21-87.